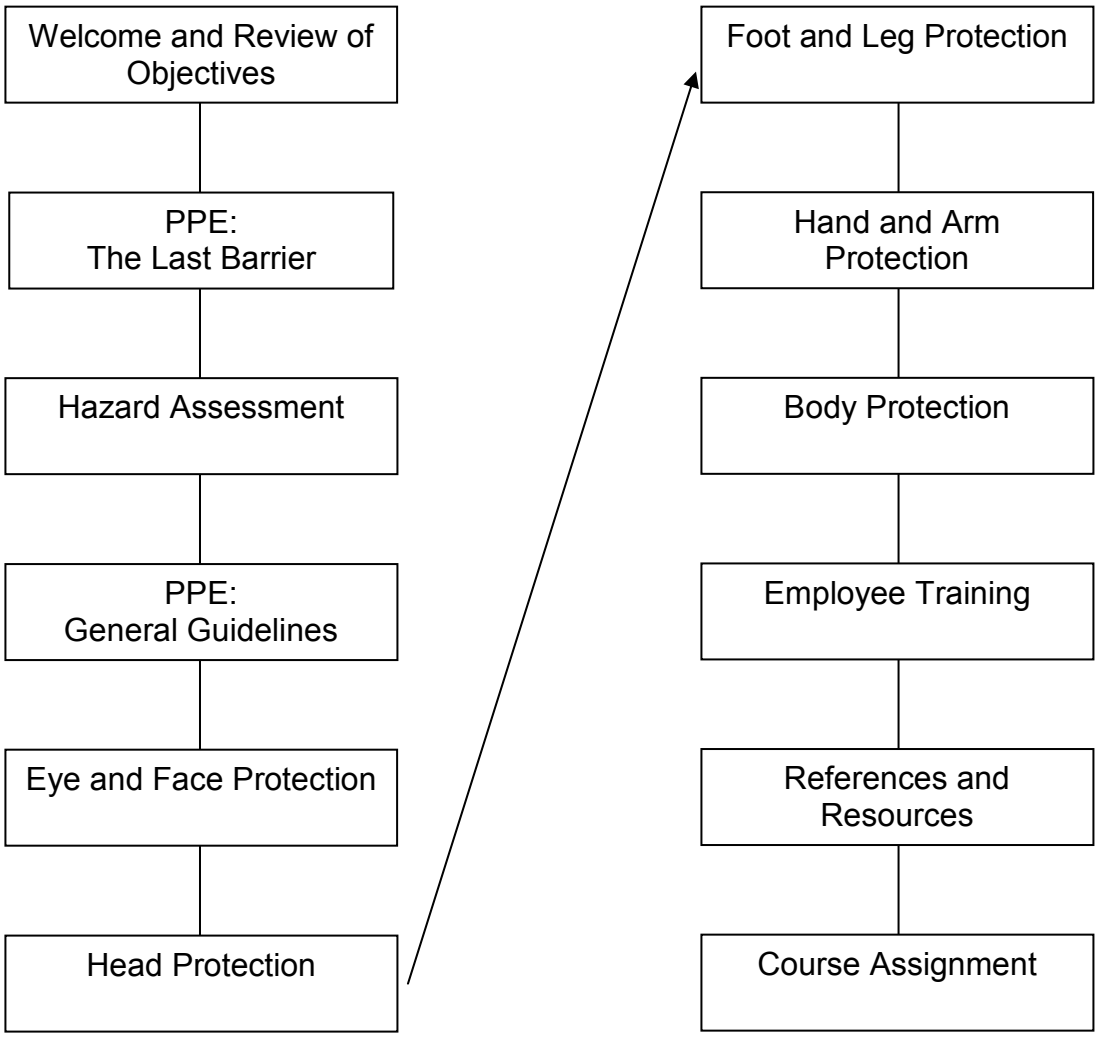
Personal Protective Equipment (PPE): Knowing You Need It Is NOT Enough!



How to Interact with the Instructor

We encourage you to ask questions and share your comments with the instructors throughout this TELNPS course. If you were physically in the classroom with the instructor, you would raise your hand to let him know you had a question or comment. Then you would wait for the instructor to recognize you and ask for your question. We are all familiar with that "protocol" for asking questions or making comments.

With TELNPS courses there is also a "protocol" to follow to ensure you can easily ask questions and others can participate as well. It may seem a little strange at first asking a question of a TV monitor. Remember, it is the instructor you are interacting with and not the monitor. As you ask more questions and participate in more TELNPS courses, you will soon be focusing only on the content of your question and not the equipment you are using to ask it.

As part of the TEL station equipment at your location, there are several push to talk microphones. Depending on the number of students at your location, you may have one directly in front of you or you may be sharing one with other students at your table.

When you have a question, press the push to talk button and say,

"Excuse me [instructor's first name], this is [your first name]
at [your location]. I have a question (or I have a comment)."

Then release the push to talk button. This is important.
Until you release the button, you will not be able to hear the instructor.

The instructor will acknowledge you and then ask for your question or comment. Stating your name and location not only helps the instructor, but also helps other students who are participating at different locations to get to know their classmates.

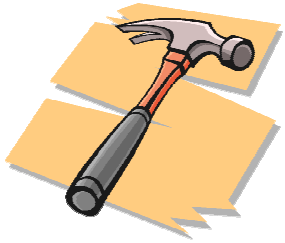
Course Objectives

Notes

At the conclusion of this workshop, you should be able to:

1. Understand the types of PPE.
2. Know the basics of conducting a "hazard assessment" of the workplace.
3. Select appropriate PPE for a variety of circumstances.
4. Explain the proper use and care for each type of PPE.
5. Understand what kind of ongoing training is needed in the proper use and care of PPE.

Let's look at a "typical carpentry shop"…



Much of the stock for the shop is received as large, heavy pieces of lumber that employees offload from trucks by hand. Boards are cut to length using a radial arm saw. Sanding and planing to prepare surfaces are done with both floor planers and power hand sanders. Finished products are painted and stained in another corner of the workshop using solvents and polyurethane based stains. There is an overhead storage rack for large scrap wood and lumber. The overhead storage rack is located above a workbench where employees do assembly, gluing and clamping. There is a small welding bay in the back of the shop that is used to repair tools and mechanical equipment.

As you go thru the workshop today, we'll refer back to this carpentry shop case study and use it to help us better understand the proper selection and use of PPE.

PPE: The Last Barrier of Defense

Notes

Refer to the chart at Appendix B (last page of this guide)

The Occupational Safety and Health Administration (OSHA) requires employers to protect their employees from workplace hazards that can cause injury. Personal protective equipment, or as it is commonly called – "PPE" – can act as a barrier protecting the employee from hazard.

The Carpentry Shop: Overhead Storage Hazard?

Refer back to the carpentry shop (page 3).

What is the hazard that the overhead storage rack presents?
What PPE might be used to protect employees from the hazard?
How else might we protect employees besides PPE?

Hazard Assessment for Selecting PPE

Notes

The hazard assessment can be broken down into 5 steps

1. Survey the workplace
2. Organize the data
3. Analyze the data
4. Use selection guidelines to select PPE
5. Reassess the workplace

Refer to Appendix A (page zzz) at the back of this guide for a checklist you can use to conduct a hazard assessment for selecting PPE.

Potential hazards may be physical or health-related, and a comprehensive hazard assessment should identify hazards in both categories.

"Hazard Assessment" determines if potential hazards exist in the workplace. The hazard assessment for PPE selection purposes is focused on a workplace (carpentry shop, typical work environment for a trails crew, vehicle maintenance shop, administration building, etc.)

"Exposure Assessment" determines whether or not the hazard identified exists at levels that are dangerous to our employees.

"Job Hazard Analysis (JHA)" takes a specific job or task (cutting hardwoods with a radial arm saw, refinishing a floor, moving storage boxes to an attic, etc.) and breaks it down into a series of steps. Each step is analyzed to determine whether or not there is a hazard associated with that step and what actions or PPE are necessary to protect the employee from that hazard.

The Carpentry Shop:
Step 1 (Survey the Workplace) of the Hazard Assessment

Refer back to the carpentry shop (page 3). Using the checklist in Appendix A, conduct a survey and answer each question "Yes" or "No" to identify whether a potential hazard exists.

PPE: General Guidelines

Notes

1. All PPE clothing and equipment should be of safe design and construction, and should be maintained in a clean and reliable fashion.

2. Employers should take the fit and comfort of PPE into consideration when selecting appropriate items for their workplace. PPE that fits well and is comfortable to wear will encourage employee use of PPE. Most protective devices are available in multiple sizes, and care should be taken to select the proper size for each employee. If several different types of PPE are worn together, make sure they are compatible. If PPE does not fit properly, it can make the difference between being safely covered or dangerously exposed. It may not provide the level of protection desired and may discourage employee use.

3. OSHA requires that many categories of PPE meet or be equivalent to standards developed by the American National Standards Institute (ANSI). ANSI has been preparing safety standards since the 1920s, when the first safety standard was approved to protect the heads and eyes of industrial workers. OSHA requires PPE to meet the following ANSI standards:
   - Eye and Face Protection: ANSI Z87.1-1989 (USA Standard for Occupational and Educational Eye and Face Protection).
   - Head Protection: ANSI Z89.1-1986.
   - Foot Protection: ANSI Z41.1-1991.
   - For hand protection, there is no ANSI standard for gloves but OSHA recommends that selection be based upon the tasks to be performed and the performance and construction characteristics of the glove material. For protection against chemicals, glove selection must be based on the chemicals encountered, the chemical resistance and the physical properties of the glove material.

4. Each piece of PPE should be inspected on a regular basis to ensure that it is still serviceable and has not been damaged in any way that would reduce its ability to protect the employee.

5. All PPE should be properly stored after use.

Eye and Face Protection

Notes

Many occupational eye injuries occur because workers are not wearing any eye protection. Others result from wearing improper or poorly fitting eye protection. Employers must be sure that their employees wear appropriate eye and face protection and that the selected form of protection is appropriate to the work being performed and properly fits each worker exposed to the hazard.

Everyday use of prescription corrective lenses will NOT provide adequate protection against most occupational eye and face hazards.

Guidelines for Selecting Eye and Face Protection

Selecting the most suitable eye and face protection for employees should take into consideration the following elements:

- Ability to protect against specific workplace hazards.
- Should fit properly and be reasonably comfortable to wear.
- Should provide unrestricted vision and movement.
- Should be durable and cleanable.
- Should allow unrestricted functioning of any other required PPE.
- Any new eye and face protective devices must comply with ANSI Z87.1-1989 or be at least as effective as this standard requires. Any equipment purchased before this requirement took effect on July 5, 1994, must comply with the earlier ANSI Standard (ANSI Z87.1-1968) or be shown to be equally effective.

Types of Eye and Face Protection

Safety glasses Goggles Welding shields Laser safety goggles
Face shields

The Carpentry Shop: Eye and Face Protection?
Refer back to the carpentry shop (page 3). Based on your workplace survey, what PPE would be appropriate to provide eye and face protection? What factors did you consider in making your selection? Be prepared to share your selection with your classmates.

Head Protection

Notes

Protecting employees from potential head injuries is a key element of any safety program. A head injury can impair an employee for life or even be fatal. Wearing a safety helmet or **hard hat** is one of the easiest ways to protect an employee's head from injury. Hard hats can protect employees from impact and penetration hazards as well as from electrical shock and burn hazards.

Class (ANSI)	Protection	OSHA Class
Class E	Provide the highest level of protection against electrical hazards, with high-voltage shock and burn protection (up to 20,000 volts). They also provide protection from impact and penetration hazards by flying/falling objects.	Class B
Class G	Provide impact and penetration resistance along with limited voltage protection (up to 2,200 volts).	Class A
Class C	Provide lightweight comfort and impact protection but offer no protection from electrical hazards	Class C

Type 1 - intended to reduce the force of impact resulting from a blow to the top of the head.

Type 2 - intended to reduce the force of impact resulting from a blow which may be received off center or to the top of the head.

The Carpentry Shop: Head Protection?
Refer back to the carpentry shop (page 3). Based on your workplace survey, what PPE would be appropriate to provide head protection? What factors did you consider in making your selection? Be prepared to share your selection with your classmates.

Foot and Leg Protection

Notes

Employees who face possible foot or leg injuries from falling or rolling objects or from crushing or penetrating materials should wear protective footwear.

Also, employees whose work involves exposure to hot substances or corrosive or poisonous materials
must have protective gear to cover exposed body parts, including legs and feet.

Safety footwear must meet ANSI minimum compression and impact performance standards in ANSI Z41-1991 (American National Standard for Personal Protection-Protective Footwear) or provide equivalent protection. Footwear purchased before July 5, 1994, must meet or provide equivalent protection to the earlier ANSI Standard (ANSI Z41.1-1967). All ANSI approved footwear has a **protective toe** and offers impact and compression protection. But the type and amount of protection is not always the same. Different footwear protects in different ways. Check the product's labeling or consult the manufacturer to make sure the footwear will protect the user from the hazards they face.

The Carpentry Shop: Foot and Leg Protection?
Refer back to the carpentry shop (page 3). Based on your workplace survey, what PPE would be appropriate to provide foot and leg protection? What factors did you consider in making your selection? Be prepared to share your selection with your classmates.

Hand and Arm Protection

Notes

If a workplace hazard assessment reveals that employees face potential injury to hands and arms that cannot be eliminated through engineering and work practice controls, employers must ensure that employees wear appropriate protection.

Types of Protective Gloves

Gloves made from a wide variety of materials are designed for many types of workplace hazards. In general, gloves fall into four groups:

- Gloves made of leather, canvas or metal mesh.
- Fabric and coated fabric gloves.
- Chemical- and liquid-resistant gloves.
- Insulating rubber gloves (See 29 CFR 1910.137 and the following section on electrical protective equipment for detailed requirements on the selection, use and care of insulating rubber gloves).

Care of Protective Gloves

Protective gloves should be **inspected** before each use to ensure that they are not torn, punctured or made ineffective in any way.

- A visual and tactile inspection will help detect cuts or tears. Gloves that are discolored or stiff may also indicate deficiencies caused by excessive use or degradation from chemical exposure.
- However, a more thorough inspection by filling the gloves with water and tightly rolling the cuff towards the fingers will help reveal any pinhole leaks.

Any gloves with impaired protective ability should be **discarded and replaced**.

The Carpentry Shop: Hand and Arm Protection?
Refer back to the carpentry shop (page 3). Based on your workplace survey, what PPE would be appropriate to provide hand and arm protection? What factors did you consider in making your selection? Be prepared to share your selection with your classmates.

Body Protection

Notes

Employees who face possible bodily injury of any kind that cannot be eliminated through engineering, work practice, or administrative controls, must wear appropriate body protection while performing their jobs.

In addition to cuts and radiation, the following are examples of workplace hazards that could cause bodily injury:

- Temperature extremes.
- Hot splashes from molten metals and other hot liquids.
- Potential impacts from tools, machinery and materials.
- Hazardous chemicals.

Types of Protective Clothing

There are many varieties of protective clothing available for specific hazards. Employers are required to ensure that their employees wear personal protective equipment only for the parts of the body exposed to possible injury.

Examples of body protection include
- Laboratory coats.
- Coveralls.
- Vests.
- Jackets.
- Aprons.
- Surgical gowns.
- Full body suits.

The Carpentry Shop: Body Protection?
Refer back to the carpentry shop (page 3). Based on your workplace survey, what PPE would be appropriate to provide body protection? What factors did you consider in making your selection? Be prepared to share your selection with your classmates.

Ear and Hearing Protection

Notes

Required for employees exposed to hazardous noise levels.

Additional training –

"You Should Hear What They're Missing:
Implementing a Hearing Loss Prevention Program."
(David Bleicher, NPS Industrial Hygienist, david_p_bleicher@partner.nps.gov)

Lungs and Respiratory Protection

Additional medical and fit testing considerations.

Additional training –

"Respiratory Protection: Breathing a Little Easier in the Workplace."
(David Bleicher, NPS Industrial Hygienist, david_p_bleicher@partner.nps.gov)

PPE: Employee Training

Notes

Employers are required to train each employee who must use PPE. Employees must be trained to **know** at least the following:

- When PPE is necessary.
- What PPE is necessary.
- How to properly put on, take off, adjust and wear the PPE.
- The limitations of the PPE.
- Proper care, maintenance, useful life and disposal of PPE.

Employers should make sure that each employee **demonstrates** an understanding of the PPE training as well as the ability to properly wear and use PPE before they are allowed to perform work requiring the use of the PPE.

If an employer believes that a previously trained employee is not demonstrating the proper understanding and skill level in the use of PPE, that employee should receive **retraining**. Other situations that require additional or
retraining of employees include the following circumstances:

- Changes in the workplace.
- Changes in the type of required PPE that make prior training obsolete.

The employer must **document** the training of each employee required to wear or use PPE by preparing a certification containing

- The name of each employee trained
- The date of training
- A clear identification of the subject of the certification.

References and Resources

Notes

Safety Personnel

- Park Safety Officer
- Regional Risk Manager
- WASO Risk Management Division

NPS Risk Management Website

1. Go to Inside NPS (http://inside.nps.gov)
2. Scroll down to the bottom right
3. Click on the NPSafe logo

OSHA Website
(http://www.osha.gov/SLTC/personalprotectiveequipment/index.html)

Course Assignment

1. Ensure that you sign the course roster.
2. Complete the course evaluation thru My Learning Manager.
3. Hazard Assessment Assignment: Using the checklist at Appendix A, complete a hazard assessment for PPE selection purposes for a workplace at your park. Go to the NPS Risk Management website and click on "Occupational Safety and Health Training" button on the left side of the webpage. The input form will be available on Thursday, February 17, 2005.

Appendix A – Workplace Hazard Assessment for PPE Selection

Suggested Questions	Typical Operations of Concern	
 **EYES**		
A1. Do employees perform tasks, or work near employees who perform tasks, that might produce airborne dust, flying particles, or flying objects?	Sawing, cutting, drilling, sanding, scraping grinding, hammering, chopping, abrasive blasting, and punch press or lathe operations.	□ Yes □ No
A2. Do your employees handle, or work near employees who handle, hazardous liquid chemicals or encounter blood splashes?	Pouring, mixing, painting, cleaning, chemical treating, siphoning, dip tank operations, emergency medical services.	□ Yes □ No
A3. Are your employees' eyes exposed to other potential physical or chemical irritants?	Battery charging, installing fiberglass insulation, and compressed air or gas operations.	□ Yes □ No
A4. Are your employees exposed to intense light or lasers?	Welding, cutting, and laser operations.	□ Yes □ No
 **FACE**		
B1. Do your employees handle, or work near employees who handle, hazardous liquid chemicals that can splash?	Pouring, mixing, painting, cleaning, chemical treating, siphoning and dip tank operations.	□ Yes □ No
B2. Are your employees' faces exposed to extreme heat?	Welding, pouring molten metal, smithing, or forging.	□ Yes □ No
B3. Are your employees' faces exposed to other potential irritants?	Cutting, sanding, grinding, hammering, chopping, pouring, mixing, painting, cleaning, siphoning, abrasive blasting.	□ Yes □ No

Appendix A – Workplace Hazard Assessment for PPE Selection

Suggested Questions	Typical Operations of Concern	
 **HEAD**		
C1. Might tools, rocks, branches or other objects fall from above and strike your employees on the head?	Work stations or traffic routes located under catwalks, low hanging pipes, scaffolds, construction, trenching, forestry, trail crew, and utility work.	□ Yes □ No
C2. When your employees stand or bend, are their heads near exposed beams, limbs, machine parts or pipes?	Construction, confined space operations, forestry and building maintenance.	□ Yes □ No
C3. Are your employees exposed to falls from heights while employing fall protection harnesses and lanyards?	Construction, building maintenance, trail crew work, forestry work, utilities work	
C4. Do your employees work with or near exposed electrical wiring or components?	Building maintenance; utility work; construction; wiring; work on or near communications, computer, or other energized equipment; and arc or resistance welding.	□ Yes □ No
C5. Do your employees work with explosives?	Demolition, explosives use or handling	□ Yes □ No
 **FEET**		
D1. Could tools, heavy equipment, heavy animals or other objects roll over, fall onto, or strike your employees' feet?	Construction, plumbing, smithing, building maintenance, trenching, utility work, warehousing, material handling, forklift operations, roadwork, and grass cutting.	□ Yes □ No

Appendix A – Workplace Hazard Assessment for PPE Selection

Suggested Questions	Typical Operations of Concern	
 **FEET (CONTINUED)**		
D2. Do your employees work with or near exposed electrical wiring or components?	Building maintenance; utility work; construction; wiring; work on or near communications, computer or other energized equipment; and arc or resistance welding.	□ Yes □ No
D3. Do your employees work with explosives or in explosive atmospheres?	Demolition, explosives use or handling, grain milling, spray painting, abrasive blasting, and work with highly flammable materials.	□ Yes □ No
 **HANDS**		
E1. Do your employees' hands come into contact with tools or materials that might scrape, bruise, cut or puncture?	Grinding, sanding, sawing, hammering, trail crew work, roadwork, forestry work, and material handling.	□ Yes □ No
E2. Do your employees' handle chemicals that might irritate skin, solvents or carcinogens, or come into contact with blood?	Pouring, mixing, painting, cleaning, siphoning, dip tank operations, automobile and heavy equipment maintenance, and emergency medical services.	□ Yes □ No
E3. Do work procedures require your employees to place their hands and arms near extreme heat or cold?	Welding, pouring molten metal, smithing, cold weather operations.	□ Yes □ No
E4. Are your employee's hands and arms placed near exposed electrical wiring or components?	Building maintenance; utility work; construction; wiring; work on or near communications, computer, or other high-tech equipment; and or resistance welding.	□ Yes □ No

Appendix A – Workplace Hazard Assessment for PPE Selection

Suggested Questions	Typical Operations of Concern	
 **BODY**		
F1. Are your employees' bodies exposed to irritating dust or chemical splashes?	Pouring, mixing, painting, cleaning, siphoning, dip tank operations, machining, sawing, battery charging, installing fiberglass insulation, and compressed air or gas operations.	□ Yes □ No
F2. Are your employees' bodies exposed to hazardous dust, fumes, mist?	Removing lead or chromate based paint or asbestos fibers.	□ Yes □ No
F3. Are your employees' bodies exposed to sharp or rough surfaces?	Cutting, grinding, sanding, sawing, glazing and material handling.	□ Yes □ No
F4. Are your employees' bodies exposed to extreme heat?	Welding, pouring molten metal, smithing, structural fire brigades or forging.	□ Yes □ No
F5. Are your employees exposed to electrical arc blast?	Confined space entry operations, high voltage utility work	□ Yes □ No
F6. Are your employees' bodies exposed to acids or other hazardous substances?	Pouring, mixing, painting, cleaning, siphoning, and dip tank operations.	□ Yes □ No
 **EARS/HEARING**		
G1. Are your employees exposed to loud noise from machines, tools, or music systems?	Machining, grinding, sanding, work near conveyors, pneumatic equipment, generators, ventilation fans, motors, and punch and brake presses.	□ Yes □ No

Appendix A – Workplace Hazard Assessment for PPE Selection

Suggested Questions	Typical Operations of Concern	
 **LUNGS/RESPIRATORY SYSTEM**		
H1. Are your employees exposed to or work near employees who are exposed to dust, particulates, welding fumes, paint spray or asbestos?	Rock drilling, painting, welding, hardwood or treated wood cutting, sanding, cleaning out rodent infested areas, paint scraping, vehicle brake repair.	□ Yes □ No
H2. Are your employees exposed to toxic gas/vapors, solvent vapors, organic vapors or chemical irritants?	Degreasing operations, pesticide or herbicide application, water treatment plant maintenance, stripping operations, vehicle maintenance.	□ Yes □ No
H3. Do your employees perform work in a confined space that potentially has an oxygen deficient environment?	Tank cleaning operations, sewer manhole operations, valve box maintenance, electrical vault maintenance, wet/dry well maintenance operations.	□ Yes □ No

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Personal Protective Equipment: The Last Barrier of Defense!

Hazard Assessment

If Hazard is Found

Reassess to Determine Effectiveness or as New Hazards are Introduced

Hazard

Select & Practice Effective Controls

Elimination/Engineering Controls

If Needed

Administrative Controls

If Needed

Proper PPE Selection

- **Eye and Face**
- **Head**
- **Foot and Leg**
- **Hand and Arm**
- **Body**
- Hearing
- **Lungs/Respiratory**

Employee Training in PPE Use & Care